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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

FERNANDEZ, KALIMAH

ART UNIT PAPER NUMBER

2881

DATE MAILED: 01/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/732,927

Applicant(s)

SHIMAZU ET AL.

Examiner

Kalimah Fernandez

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 5) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1,3,8 and 10 stand rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat No 4,827,138 issued to Randall.

3. Randall teaches the use of an electron beam exposure apparatus for manufacturing a master mask (col.5, lines 39-45).

4. Randall teaches the use of other patterning technique for manufacturing a child mask wherein said master mask is used in said manufacturing of said child mask (col.5, lines 43-50).

5. Randall also teaches an electron beam proximity exposure method (col.3, lines 47-68).

6. It would have been obvious to an ordinary skilled artisan to use said electron beam proximity exposure method in manufacturing of said child mask as described in col.5, lines 39-45.

7. As per claims 3 and 10, Randall teaches the claimed invention except for using the child mask as the master mask in the electron beam proximity exposure method.

8. Rather, Randall teaches the use of the first mask fabricated as the master mask (col.5, lines 43-45).

9. However, it would have been obvious to an ordinary artisan to use the second mask fabricated as the master mask or using each previous mask to fabricate the next mask since the breadth of Randall's disclosure suggest that any mask fabricated according the disclosed method can act as a master mask.

10. Claims 2,4,9 and 11 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Randall and in view of US Pat No 4,463,265 issued to Owen et al.

11. Randall teaches the claimed invention except for "the master mask is exposed from a side facing the child mask and the child mask from the side facing the object". In addition, Randall does not teaches manufacturing the " child mask is n-times, a pattern exposed on the master mask is pattern right and left reversed from a pattern on the object when $n+1$ is an odd

number and the pattern exposed on the master mask is a pattern non-reversed from the pattern on the object when $n+1$ is an even number”.

12. However, Owen et al teaches the technique for compensates for the reduction in resolution due to the proximity effect, in which a reverse field pattern is defined as the negative of the circuit pattern to be drawn (col.4, lines 1-16).

13. Owen et al teaches exposing a workpiece (or a child mask) to a desired pattern and subsequently exposing said workpiece (or child mask) to a reverse exposure (col.6, line 49- col.7, line 3; col.8, lines 57-67).

14. It would have been obvious to an ordinary artisan to combine the teachings of Randall and Owens et al since Owens et al discloses the advantage of compensation for the proximity effect caused by electron exposure (see col.9, lines 5-30). That is, an ordinary artisan would have found obvious motivation to expose the reverse pattern of master mask onto the child mask to compensate for the proximity effect as taught by Owens et al. Since Owen et al teaches the advantage of reduce of computation time (col.4, lines 17-29).

15. Claims 5-7 and 12-14 are stand under 35 U.S.C. 103(a) as being unpatentable over Randall and in view of US Pat No. 6,177,680 issued to Dick et al.

16. Randall teaches the claimed invention except for correcting distortion. However, Dick et al teaches generation of corrected pattern data, which measures distortion and compensates for said distortion by changing the beam control data including the beam deflection (i.e. the application of the beam direction) (col.5, lines 15-45).

17. It would have been obvious to an ordinary skilled artisan to combine the teachings of Randall and Dick et al since Dick et al teaches fabrication of mask free of pattern-dependent errors with the advantage of a reduction in processing time (col.2, lines 1-5).

18. In addition, Randall teaches the claimed invention except for using the child mask as the master mask in the electron beam proximity exposure method.

19. Rather, Randall teaches the use of the first mask fabricated as the master mask (col.5, lines 43-45).

20. However, it would have been obvious to an ordinary artisan to use the second mask fabricated as the master mask or using each previous

mask to fabricate the next mask since the breadth of Randall's disclosure suggest that any mask fabricated according to the disclosed method can act as a master mask.

21. As per claims 6-7 and 13-14, the obvious combination of Randall and Dick et al reads on extending the correction to the distortion generated when using the master mask in fabricating the child mask.

22. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Randall as applied to claim 1 above, and further in view of US Pat No 5,831,272 issued Utsumi et al.

23. Randall et al discloses the claimed invention except for changing the application direction of electron beam generated by the electron beam proximity apparatus.

24. However, Utsumi et al teaches changing the application direction of electron beam generated by the electron beam proximity apparatus (col.4, lines 53-56).

25. It would have been obvious to an ordinary artisan to combine the teachings of Randall and Utsumi et al since Utsumi et al teaches the advantage of improved performance (col.3, lines 12-27).

Response to Arguments

26. Applicant's arguments filed 10-23-03 have been fully considered but they are not persuasive. Applicant asserts that " Randall contains no discussion, in above recited section or anywhere else in the patent, of using an electron beam proximity exposure apparatus to produce the child masks as presently claimed".

27. In response, Randall discloses the use of two lithographic techniques to fabricate a master and subsequent child master, wherein one lithographic technique (e.g. electron beam projection or proximity) may be used to fabricate the master mask and another lithographic technique (e.g. ion beam lithography) is used to fabricate child masks (col.5, lines 39-50).

28. Moreover, Randall discloses the capability to select a range of lithographic techniques including electron beam lithography and the like.

29. Therefore, the claimed invention is merely an obvious variation of Randall's invention, which recites the use of electron beam lithography to fabricate the master mask and electron beam proximity lithography to fabricate the child mask.

30. Specifically, it is pointed out that Randall's disclosure states, "These future masks may be exposed using ion beam lithography as described in connection with the present invention. Of course, those skilled in the art may advantageously design other techniques for patterning the above-described high resolution pattern on the surface 16 "(col.5, lines 45-50). Here, Randall discloses the ability to uses other lithography techniques (e.g. electron beam proximity lithography) to fabricate child masks.

31. Finally, Randall teaches the use of his mask in electron beam proximity lithography (col.8, lines 13-20; col.3, lines 47-65). Therefore, an ordinary artisan would have obvious motivation to fabricate the master proximity mask via electron beam lithography as in col.5, lines 39-45 of Randall and subsequently use the first master proximity mask in an electron beam proximity system as discloses in col.8, lines 13-15; col.3, 47-65 of Randall to fabricate child mask.

32. For the above-stated reasons, applicant's arguments are deemed unpersuasive. The claimed invention is unpatentable over Randall's disclosure as stated in the above rejection.

Conclusion

33. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following prior art are included to illustrate the general available knowledge in the art (i.e. art-recognized equivalency of electron beam lithography, electron beam proximity lithography, and ion beam lithography). US Pat 4,596,467 issued to Bartelt teaches the equivalency in col.1, lines 12-16 (see also., US Pat 6,624,429 issued to Wolfe et al (col.1, line 56- col.2, line 6)).

34. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the

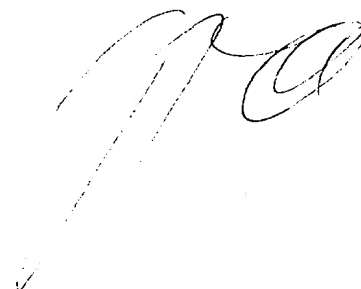
mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kalimah Fernandez whose telephone number is 703-305-6310. The examiner can normally be reached on Mon-Thurs between 7:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R Lee can be reached on 703-308-4116. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

kf

A handwritten signature in black ink, appearing to be 'J. R. Lee', is located in the bottom right corner of the page.